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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/686,370	10/12/2000	Masashi Saito	07553.0010	4800

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EXAMINER

KACKAR, RAM N

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 06/09/2003

14

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/686,370

Applicant(s)

SAITO ET AL.

Examiner

Ram N Kackar

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-- **Th MAILING DATE of this communication app ars on th cov r she t with the correspondence address --**

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-11 and 14-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-11 and 14-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Cancellation of claim 24

1. Claim 24 directed to a method and added through the latest amendment dated 5/21/2003 in paper number 13 has been cancelled in agreement with Dustin T. Johnson.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 14-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this instance “circulating gas holes are spaced differently than the primary gas supply holes, and surround the primary gas holes” has no support in the specification. In case the applicant relies upon Fig 4 for the support, it should be noted that not only some circulating gas holes surround the primary gas holes. On the other hand, some primary gas holes also surround the circulating holes.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5 Claims 14-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In this instance “circulating gas holes are spaced differently than the primary gas supply holes, and surround the primary gas holes” is indefinite as it is not clear if circulating gas holes surround all primary gas supply holes. Also “differently” is indefinite.

Claim Rejections - 35 USC § 103

6 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7 Claims 1, 3-6, 8-11 and 14-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurihara (JP 09251981 A) in view of Umotoy et al (US 6086677) and Moslehi et al (US 5453124).

Kurihara et al disclose independent gas flow systems comprising, primary gas flow (Fig 5, 111 or 112), circulating gas flow (107), both through plurality of holes (Fig 5 302), a vacuum apparatus (303 and 106) and constancy of density and hole radius for primary gas supply constant over the surface where holes exist (Fig 5-302).

Kurihara et al however do not expressly disclose radius and density of primary gas supply holes constant over entire surface where any holes exist and that the number of circulating holes being higher than the primary supply holes.

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Umotoy et al disclose a supply system for two independent gases (Fig 1-116,118) where gases enter the processing chamber through a showerhead so that the holes are inter spread and both primary and secondary holes density and radius are constant over entire surface (Fig 1-148).

Moslehi et al teach a programmable multizone gas injector where injector parameters could be varied in any number of ways (Abstract, Fig 1 and Col 7 lines 22-29). Thus the number of holes or the area of holes, in a zone could be made higher or lower compared to another zone depending upon process requirement.

Therefore it would have been obvious for one of ordinary skill in the art at the time invention was made to replace the shower head of Kurihara with the one of Umotoy et al with higher circulating gas holes, so as to make both primary and circulating gases flow evenly on the substrate with required circulating gas with higher conductance.

Regarding claim 3 -5 Umotoy et al disclose radius, density and ratio of density of gas supply holes, constant over entire surface (Fig 1-148). As an example, the ratio of area over which primary and circulating holes exist is disclosed to be 1, which would be one of the valid ratios of target flow rates. Setting of holes radius and density to ensure back-pressure below the rating of the vacuum pump would be an obvious feature to ensure integrity of the vacuum system.

Regarding claim 6 Kurihara discloses means of controlling conductance and in turn flow (Fig 5 112 and 108).

Adjustment of these controls in addition to hole radius and hole density to make the conductance of circulating system higher than that of primary gas supply in order to achieve

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target flow without increasing back-pressure would be obvious to one of ordinary skill in the art at the time invention was made.

Regarding claim 8 both Kurihara et al (Fig 5- 302) and Umotoy et al (Fig 1-144 and 136) disclose buffer space above primary and circulating holes.

Regarding claim 9 and 21 Kurihara et al disclose means for filtering circulating gas (Fig 1- 113).

Claims 10, 11, 22 and 23 are directed to an intended use and do not structurally define any thing over Kurihara.

Regarding claim 14 Umotoy discloses primary gas holes around circulating and circulating holes around primary.

Regarding claim 15 the area of holes is related to the number of holes and has been addressed in Moslehi.

Response to Amendment

Applicants arguments filed on 05/21/2003 have been considered but not found to be persuasive.

Regarding rejections of claims 1, 3, 6 and 8-11 under 35 USC 112, applicants argument has been accepted with the scope of the claims being set clearly in the remarks. As applicant has used similar language in claim 15, it is understood that the scope of claim is limited to the situation where the total area of the circulating gas supply holes is greater than the total area of primary gas supply holes.

Regarding art rejections, the amendments have not helped these claims to distinguish over prior art and the rejections are basically repeated.

Applicant has argued that no motivation exists for the combination of Umotoy and Moslehi with Kurihara. Examiner disagrees. Kurihara discloses circulating a part of exhaust gas back to the process chamber for the reason of conservation and shows this in a simple schematic (Fig 5) without expressly disclosing the details about spacing of distribution holes. Umotoy discloses the holes spaced for even distribution (Fig 1) and Moslehi teaches that parameters relating to distribution of more than one gas are basically driven by process requirements (Abstract and Col 7 lines 23-29). The apparatus disclosed by Kurihara is designed to process semiconductor wafers and it would be obvious to one of ordinary skill in the art to make sure that the gases are distributed evenly on the face of the substrate. Doing any other way would reduce process uniformity and not serve the basic purpose of processing.

The number of circulating holes are related to the conductance and the flow of circulating gas and are therefore driven by the process requirement as taught by Moslehi. Modifications like this are considered to be normal optimization and would be obvious to one of ordinary skill in the art.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 703 305 3996. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703 308 1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9310 for regular communications and 703 872 9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

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RK

June 5, 2003


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
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